NORTH CAROLINA
Department of Transportation









# Structure Breakout

Aaron Earwood / John Partin / Jay Boyd

February 22, 2018

# Construction Unit

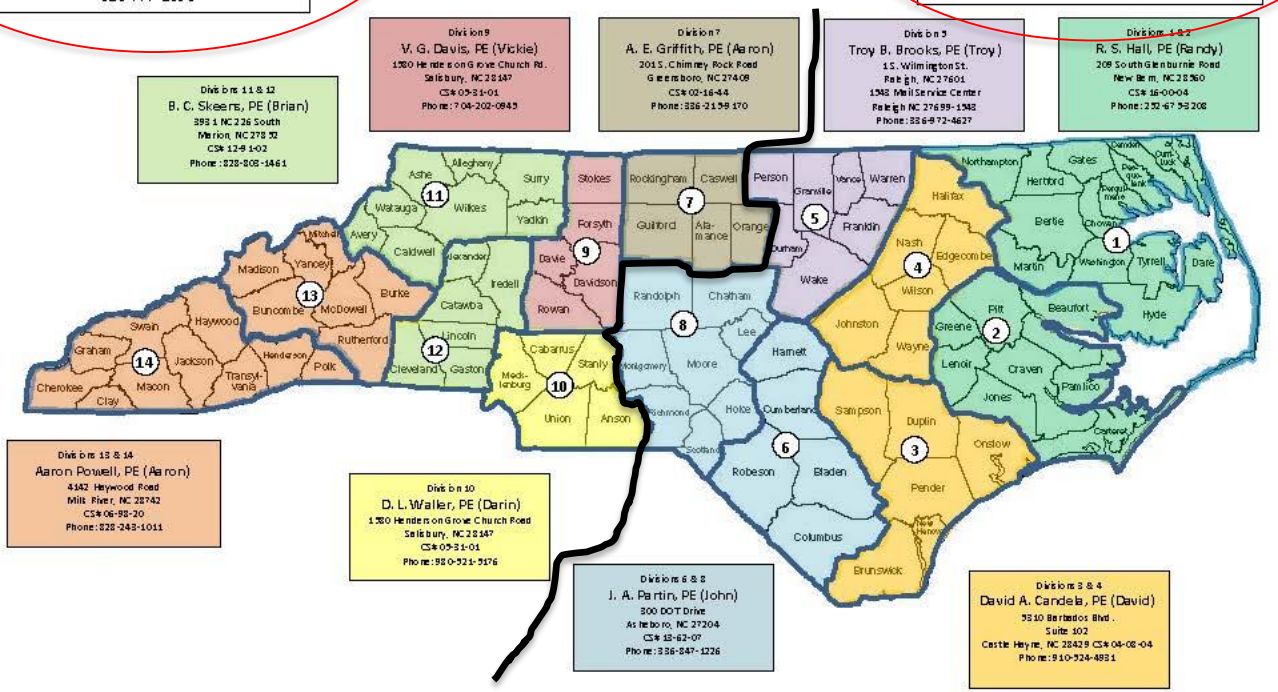
# Regional Bridge Engineers

TBA

**A. Cameron Cochran, PE**
Regional Bridge Construction Engineer
(Western Region)
Divisions 7, 9, 10, 11, 12, 13, and 14
828-777-2690

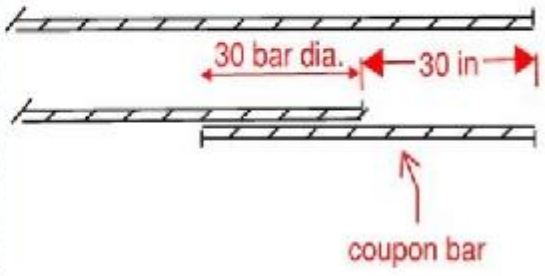
**R. Cadmus Capehart, PE**
Assistant State Construction Engineer
(Eastern Region)
Divisions 1, 2, 3, 4, 5, 6, and 8
919-323-0292

**Aaron V. Earwood, PE**
Regional Bridge Construction Engineer
(Eastern Region)
Divisions 1, 2, 3, 4, 5, 6, and 8
919-730-5138




July 24, 2017

# ulletin




## Current Issues: "Sample" Bars

If you have built a bridge then you have likely received a bundle of "sample" bars, or coupon bars, with the reinforcing steel. There are


August 1, 2017

1. Current Issues
2. OSHA silica protections
3. Specification Questions
4. New Training

OSHA Silica Rules:

On September 23rd, 2017, new rules regarding exposure to silica became enforceable by OSHA. It is the responsibility of contractor to comply with rules and to protect his oyees accordingly. fly, we should keep ves safe and minimize our exposure to hazards. It be a good idea to s these rule changes with ontractor before concrete g operations and see steps they have taken to ct their workers.

1 of 2

## OSHA Silica Rules:

On September 23rd, 2017, new rules regarding exposure to silica became enforceable by OSHA. It is the responsibility of


## Special Provision Questions:

**Question:** If a contractor installs less causeway than is shown on the plans can I pay part of the "Construction, Maintenance and Removal of Temporary Access" line item? Or if the contractor doesn't install the causeway shown on the plans do I still have to pay for the "Construction, Maintenance and Removal of Temporary Access" line item?

**Answer:** If the contractor installs all, part of, or even none of the causeway shown in the plans you still pay the full lump sum for the "Construction, Maintenance and Removal of Temporary Access" line item.

## New Training

Several new videos have been added to the NCDOT Construction Unit Training YouTube playlist. These include:

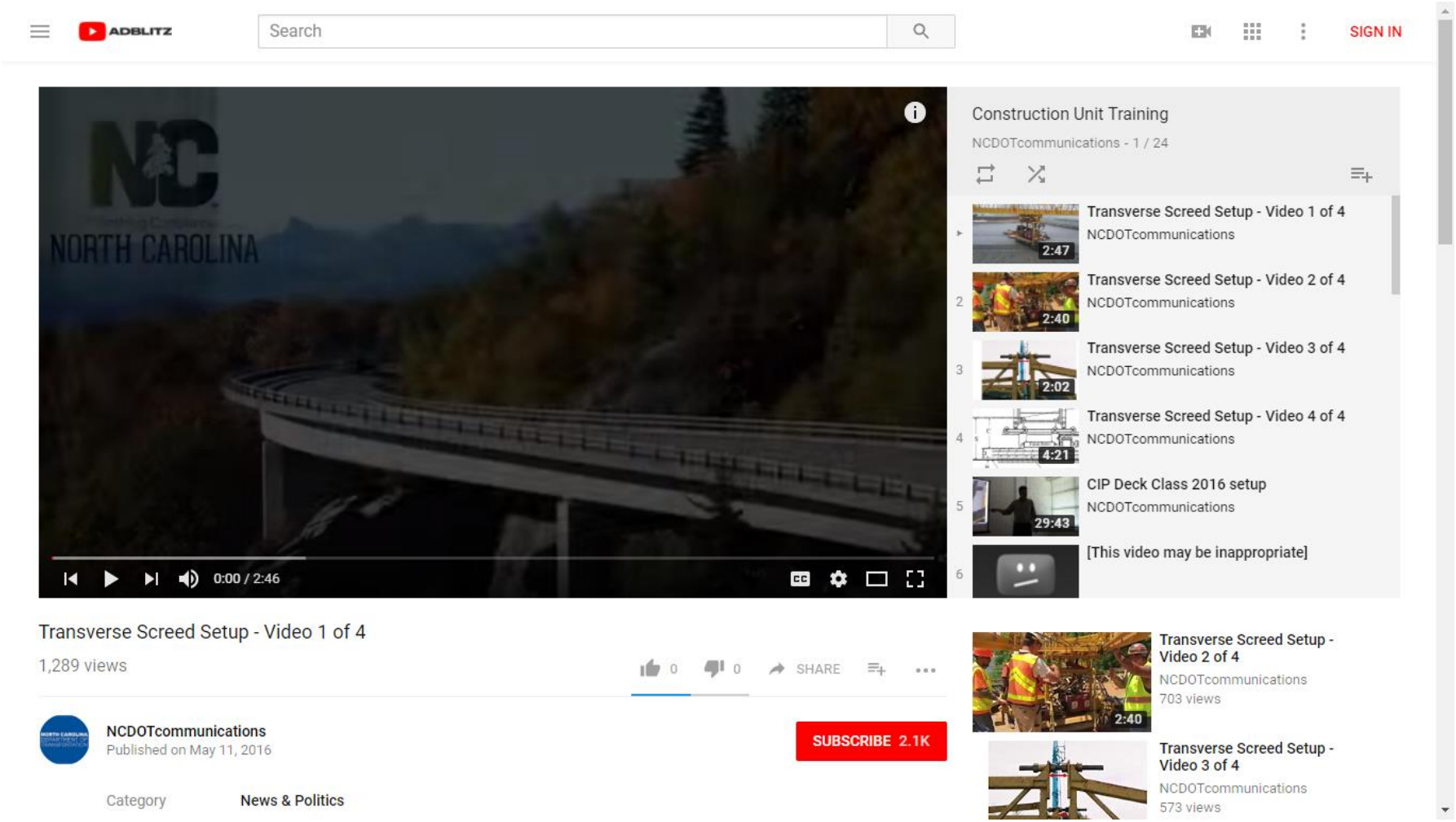
Cored Slab and Box Beam:

1. Introduction
2. Tensioning
3. Grouting
4. Barrier and Wearing Surface

## New Editable Drilled Shaft Forms

Ask your Area Construction Engineer for a copy

# YouTube


ADBLITZ
Search
SIGN IN
NORTH CAROLINA
0:00 / 2:46
Construction Unit Training
NCDOTcommunications - 1 / 24
Transverse Screed Setup - Video 1 of 4
NCDOTcommunications
2:47
Transverse Screed Setup - Video 2 of 4
NCDOTcommunications
2:40
Transverse Screed Setup - Video 3 of 4
NCDOTcommunications
2:02
Transverse Screed Setup - Video 4 of 4
NCDOTcommunications
4:21
CIP Deck Class 2016 setup
NCDOTcommunications
29:43
[This video may be inappropriate]
Transverse Screed Setup - Video 1 of 4
1,289 views
0
0
SHARE
NCDOTcommunications
Published on May 11, 2016
SUBSCRIBE 2.1K
Category
News & Politics
Transverse Screed Setup - Video 2 of 4
NCDOTcommunications
703 views
2:40
Transverse Screed Setup - Video 3 of 4
NCDOTcommunications
573 views

# Fly Ash in Decks

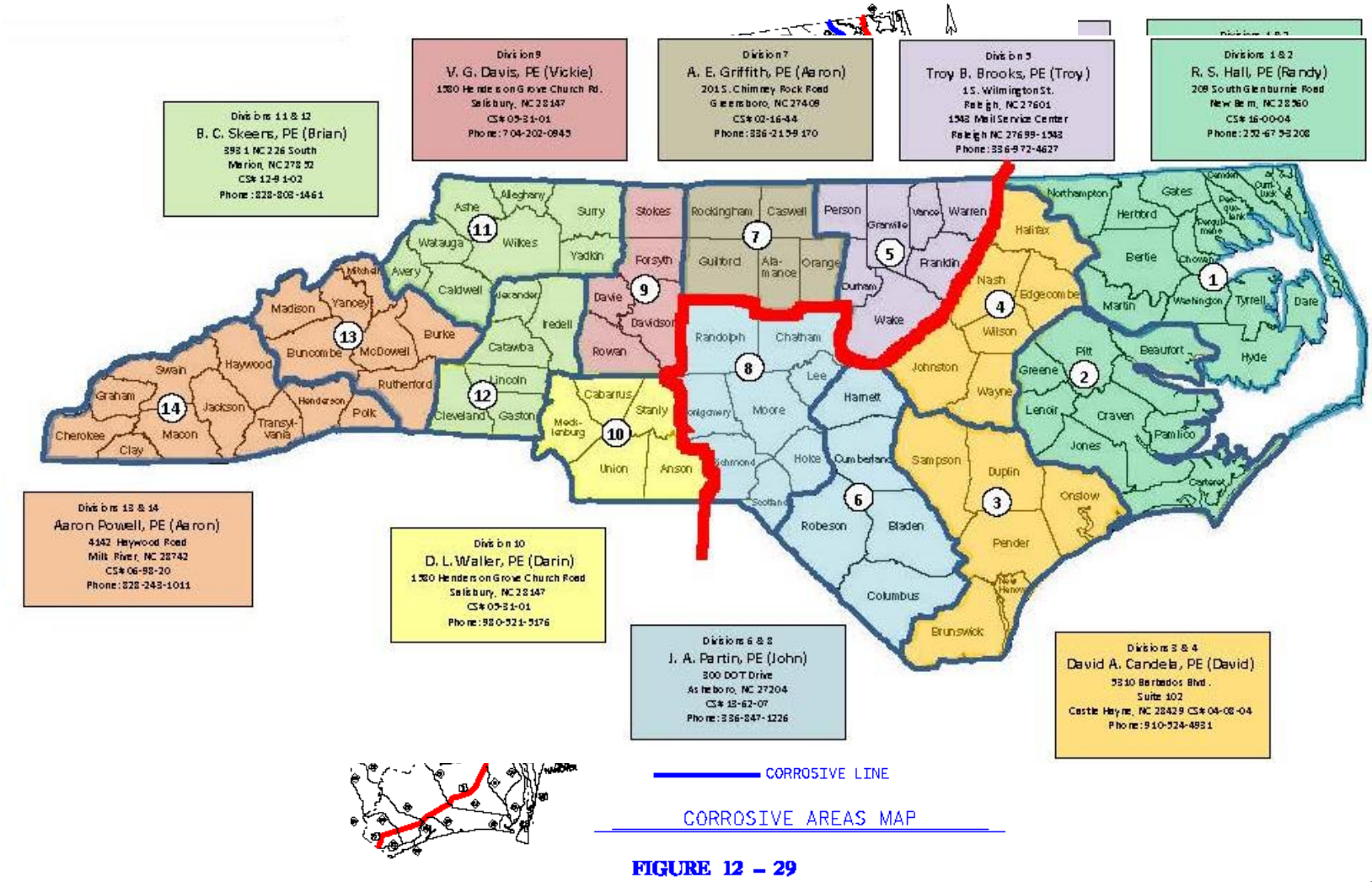



**FIGURE 12 – 29**

# Environmental Moratoria

- Recurring problem of agencies having to grant more time to work beyond moratoria.
- Problem exacerbated by running past allowed extension
- Problem also exacerbated by not pursuing the work

# Environmental Moratoria

PROSECUTION OF WORK:
(7-1-95) (Rev. 8-21-12)

The Contractor will be required to prosecute the work in a continuous and uninterrupted manner at each site from the time he begins the work until completion and final acceptance of the work at that site. The Contractor will not be permitted to suspend his operations except for reasons beyond his control or except where the Engineer has authorized a suspension of the Contractor's operations in writing.

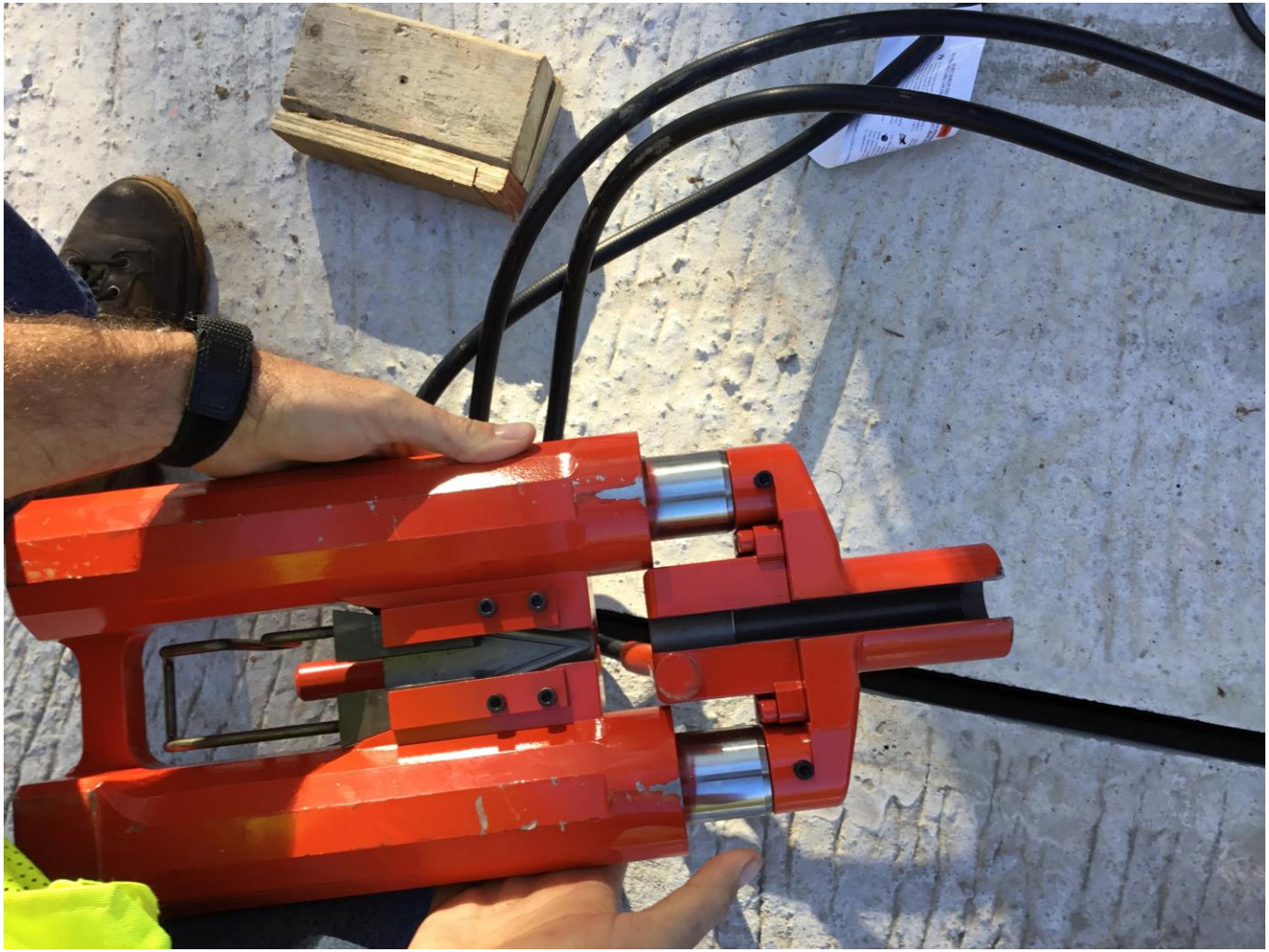
The existing bridges are not to be removed nor the detours installed until the contractor is prepared to begin the work of installing their replacement.

In the event that the Contractor's operations are suspended in violation of the above provisions, the sum of $500.00 will be charged the Contractor for each and every calendar day that such suspension takes place. The said amount is hereby agreed upon as liquidated damages due to extra engineering and maintenance costs and due to increased public hazard resulting from a suspension of the work. Liquidated damages chargeable due to suspension of the work will be additional to any liquidated damages that may become chargeable due to failure to complete the work on time.

# New Jack Requirements

# New Jack Requirements

# New Jack Requirements

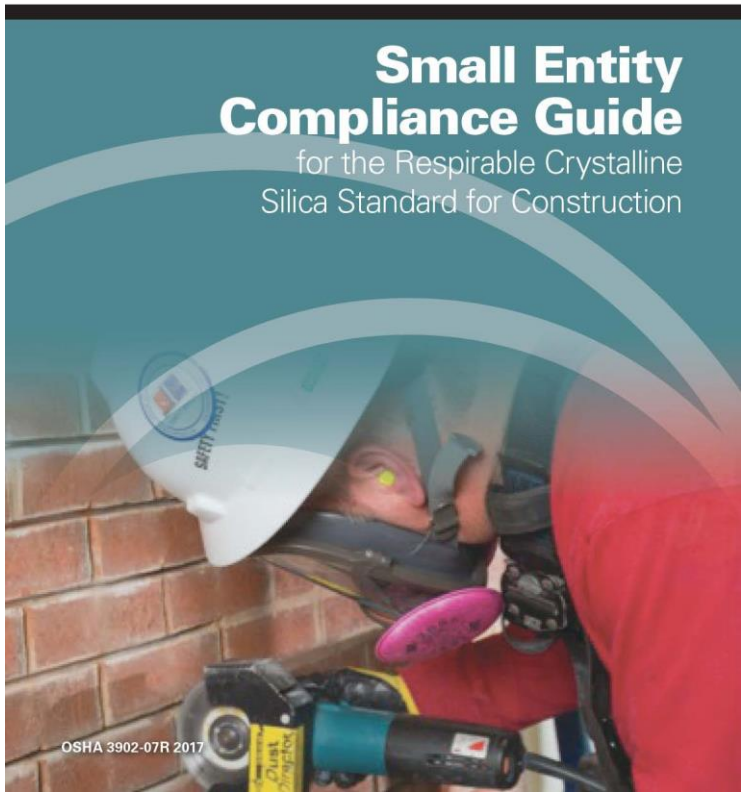


# New Jack Requirements

# New Screed Requirements

# New OSHA Silica Requirements

OSHA® Occupational Safety and Health Administration
www.osha.gov



# New OSHA Silica Requirements

- Stationary masonry saws;
- Handheld power saws;
- Walk-behind saws;
- Drivable saws;
- Rig-mounted core saws or drills;
- Handheld and stand-mounted drills (including impact and rotary hammer drills);
- Dowel drilling rigs;
- Vehicle-mounted drilling rigs;
- Jackhammers and handheld powered chipping tools;
- Handheld grinders;
- Walk-behind milling machines and floor grinders;
- Drivable milling machines;
- Crushing machines; and
- Heavy equipment and utility vehicles when used to abrade or fracture silica-containing materials (such as hoe-ramming or rock ripping) or during demolition activities, and for tasks such as grading and excavating.

# New OSHA Silica Requirements

- How does this affect us?
- How can we minimize the problem?
- Can we eliminate or change work requirements in order to ease the problem?

# Sampling Concrete – Deck Pours

# Sampling Concrete – Deck Pours

- Sampling Best Practices
- Pump Angle impacts on Concrete
- Correlating Truck to Pump

# Sampling Best Practices Option 1

Must be a continuous flow.  Do not stop pump to fill wheelbarrow!

# Sampling Best Practices Option 2

Shovel Into Wheelbarrow

# Pump Angle Impacts

# Correlating Truck to Pump

- 420-5 in Construction Manual
- Test at truck & pump and compare results


# Correlating Truck to Pump

- Continue both until losses are consistent
- Accept concrete at truck taking into account losses (or gains) from correlation
- All samples must be from pump discharge

# Correlating Truck to Pump

**Deck Pour Concrete Testing Record Keeping**

| | | | |
|---|---|---|---|
| Contract #: C123456 | TIP #: B-1234 | Mix Design #: 632VF63J45FRE | Date: |
| Structure #: 3 | Span and/or Pour #: Span B/Pour 2 | Inspectors: J. Hendrix, E. Presley, R. Plant, J. Morrison, S. Tyler | |
| Bridge Name/Desciption: Bridge over -Y4- | | | |

*Correlate truck to pump for 2 or more trucks until consistent changes through pump are observed. Then, accept concrete at truck, taking into account changes from correlation. Recorrelate when cylinders are required, when changing spans, or if a variation in slump or excessive change in pump boom angle is noticed. Cylinders must be made from pump discharge.*

| At Truck | | | | | | | | | On Deck | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Temperature | | | | | | | | | | |
| Load # | Truck # | Batch Time | Discharge Time | Air | Conc | Slump | Chase | Air Pot | Sample # | Slump | Chase | Air Pot | Air Change Thru Pump | Remarks |
| 1 | 2564 | 5:06 AM | 6:24 AM | 65 | 71 | 3.25 | 6 | 6.1 | | 3 | 4.9 | 5.1 | 1 | Added 2 oz air at truck |
| 2 | 2345 | 5:20 | 6:48 | 65 | 72 | 3.5 | 6.8 | 6.9 | | 3 | 5.5 | 5.6 | 1.3 | |
| 3 | 3423 | 5:32 | 7:05 | 66 | 72 | 3.25 | 6.5 | 6.6 | 1 | 3.25 | 5.3 | 5.4 | 1.2 | Cylinders made |
| 4 | 4536 | 5:43 | 7:20 | 66 | 73 | | 6 | | | | | | 1.2 | |
| 5 | 4681 | 5:51 | 7:30 | 67 | 73 | | 5.9 | | | | | | 1.2 | |
| 6 | 1426 | 6:01 | 7:38 | 67 | 74 | 3.5 | 6.4 | 6.5 | | | | | 1.2 | |
| 7 | 8236 | 6:14 | 7:45 | 67 | 74 | | 6.9 | | | | | | 1.2 | |
| 8 | 1928 | 6:22 | 7:55 | 68 | 74 | | 7.1 | | | | | | 1.2 | |
| 9 | 3430 | 6:31 | 8:07 | 68 | 74 | 4 | 6.3 | 6.5 | | 3.5 | 5.6 | 5.7 | 0.8 | Correlation Check |
| 10 | 2564 | 6:40 | 8:20 | 68 | 75 | | 6.3 | | | | | | 0.8 | |
| 11 | 2345 | 6:50 | 8:30 | 68 | 74 | | 5.4 | | | | | | 0.8 | |
| 12 | 4536 | 6:59 | 8:41 | 68 | 75 | 3 | 6.1 | 6.1 | 2 | 3 | 5.5 | 5.5 | 0.6 | Cylinders made |
| 13 | 4681 | 7:13 | 8:51 | 69 | 76 | | 5.8 | | | | | | 0.6 | |
| 14 | 1426 | 7:26 | 9:02 | 69 | 75 | | 6 | | | | | | 0.6 | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

# Testing From Pump Discharge

- Is it ok if I want to test every load from the pump?
  - Still need correlation
  - Don’t stop the pump or screed unless borderline results are expected

# Current Bridge Funding - Federal

<table>
<tr><th colspan="3">TRUST FUND</th></tr>
<tr><td colspan="2">BRIDGE</td><td>INTERSTATE MAINTENANCE</td><td>STI</td></tr>
<tr><td colspan="2">$65M</td><td rowspan="2">$130M ($15M BRIDGE)</td><td rowspan="2">VARIES</td></tr>
<tr><td>$25M<br>OFF FEDERAL SYSTEM</td><td>$40M<br>URESTRICTED</td></tr>
<tr><td colspan="2">REPLACEMENT PRESERVATION</td><td>REPLACEMENT PRESERVATION</td><td>NEW OR REPLACEMENT BRIDGES IN CAPITAL PROGRAM</td></tr>
</table>

# Current Bridge Funding - State

| HIGHWAY FUND | |
|---|---|
| **BRIDGE PROGRAM** | **BRIDGE PRESERVATION** |
| **$280M** | **$80M FY17/18**<br>**$85M FY18/19** |
| REPLACING DEFICIENT BRIDGES | PRESERVATION<br>REHABILITATION |

# 15 Year Bridge Program Goals

| 10% Deficient | | |
|---|---|---|
| Statewide (13,561 Bridges) | | |
| 2% | 6% | 15% |
| Interstate | Primary | Secondary |

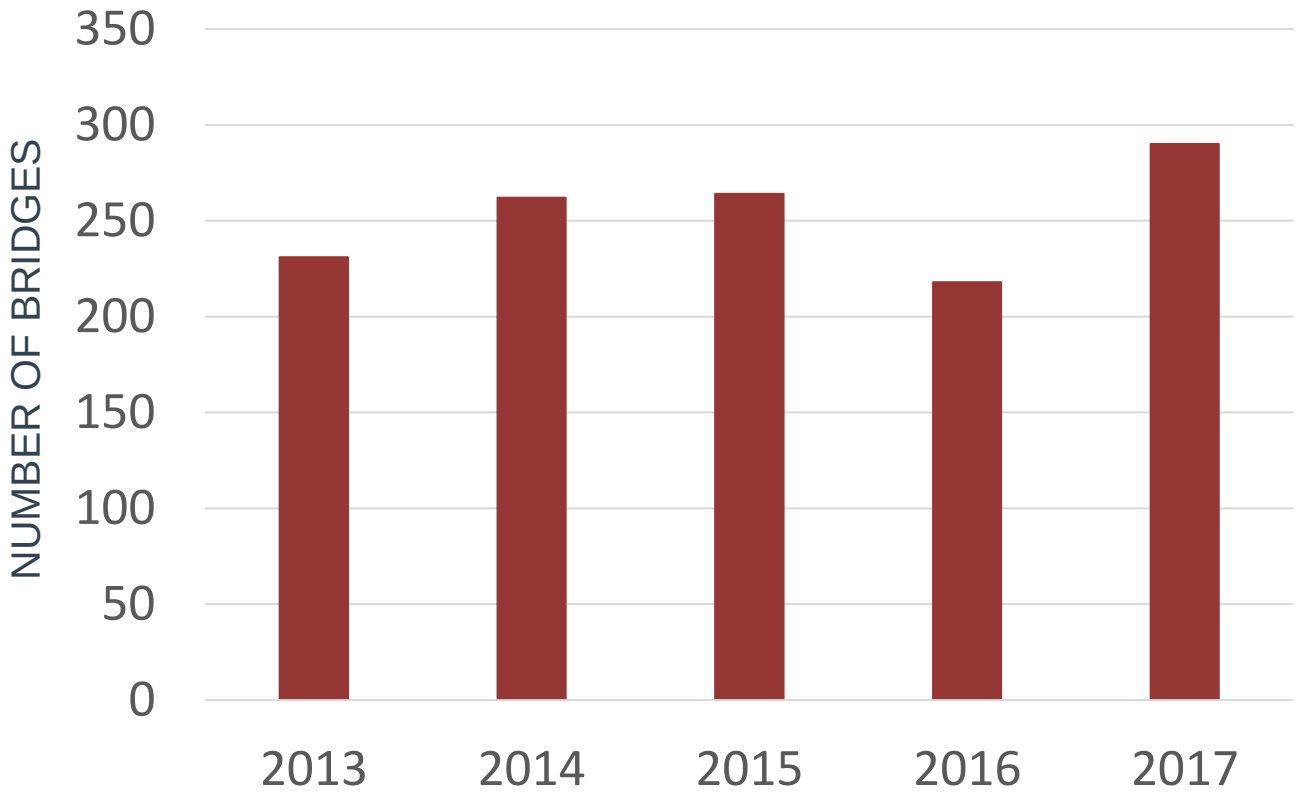
# Progress Toward All Goals

| GOALS | | | 2014 | | | CURRENT | | |
|---|---|---|---|---|---|---|---|---|
| 10% Deficient | | | 16.4% Deficient | | | 12.9% Deficient | | |
| 2% | 6% | 15 % | 4% | 9% | 21 % | 4% | 9% | 16 % |
| Interstate | Primary | Secondary | Interstate | Primary | Secondary | Interstate | Primary | Secondary |

# Challenges Going Forward

- Annual number of bridges becoming deficient
- Large inventory in fair to poor condition
- High value bridge inventory

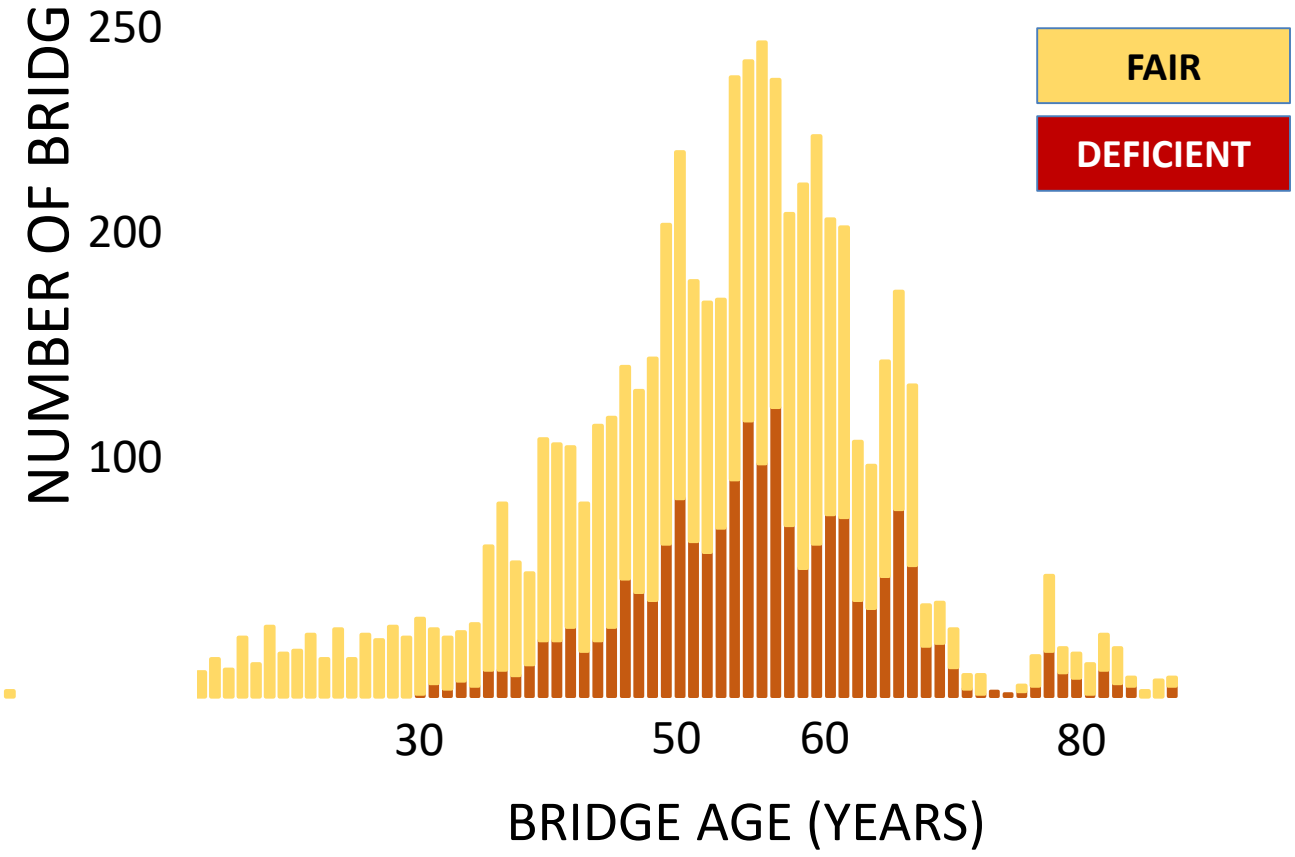
# Bridges Becoming Deficient




**250**
BRIDGES
PER YEAR

**290**
IN 2017

# Fair & Poor Bridge Inventory



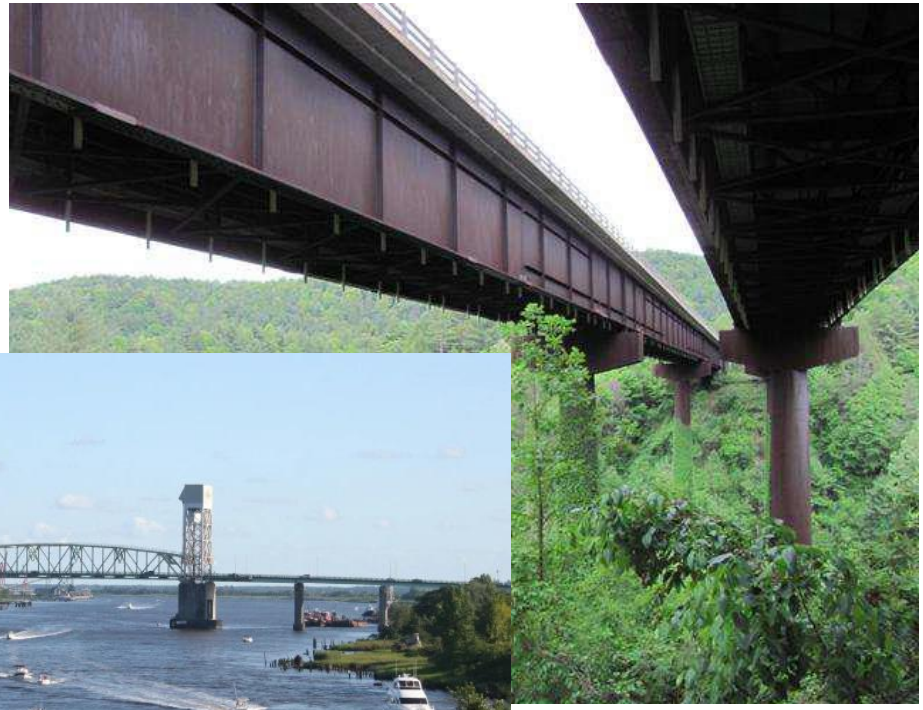

| 0-30 YEARS | |
|---|---|
| 5,337 BRIDGES | |
| 347 | 0 |
| LOW $ NEEDS | |
| **30-50 YEARS** | |
| 3,073 BRIDGES | |
| 1,083 | 387 |
| INCREASING $ NEEDS | |
| **50+ YEARS** | |
| 5,147 BRIDGES | |
| 2,305 | 1,370 |
| HIGH $ NEEDS | |

# Challenge: High Value Bridges

REPLACEMENT COSTS BETWEEN **$20M & $439M**

**204** BRIDGES

TOTAL PRESERVATION NEEDS: **$300M**



# 5 Year Bridge Allocation Snapshot

| | Divisions | Central | High Dollar | HVB Preservation | Federal Aid | Total |
|---|---|---|---|---|---|---|
| 2018 | $137 M | $103 M | $10 M | $46 M | $60 M | $356 M |
| 2019 | $113 M | $140 M | $31 M | $45 M | $67 M | $396 M |
| 2020 | $117 M | $95 M | $31 M | $48 M | $119 M | $410 M |
| 2021 | $91 M | $100 M | $ 0 M | $45 M | $115 M | $351 M |
| 2022 | $81 M | $214 M | $146 M | $30 M | $104 M | $575 M |
| | | | | | | |
| | | | | Totals (5 Year Program) | | $2088 M |

# Express Design Build

## Benefits to NCDOT

- Single point of contact for program management
- Rapid procurement
- Far less investment by contractors and firms pre-bid (less risky business model)
- Can move quickly, with all pre-bid activities completing in less than 10 months and Emergency Express DB pre-bid completed in less than 2 months.



Overall, within span of
72 months, letting
76 contracts to replace roughly
574 bridges statewide and
1 pavement rehabilitation.

# Express Design Build

| | ARRA | | Express Design-Build | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | |
| Division | Contracts | Bridges | Contracts | Bridges | Contracts | Bridges | Contracts | Bridges | Contracts | Bridges | Contracts | Bridges | Contracts | Bridges | Contracts | Bridges |
| 1 | 3 | 19 | 2 | 18 | 1 | 8 | | | | | | | 1 | 3 | | |
| 2 | | | 1 | 11 | | | | | | | | | | | | |
| 3 | | | 1 | 9 | | | | | | | | | | | | |
| 4 | | | 1 | 13 | 2 | 17 | | | | | 2 | 15 | 3 | 6 | | |
| 5 | | | 1 | 7 | 2 | 16 | | | | | | | | | | |
| 6 | 1 | 10 | 1 | 12 | 1 | 16 | | | 1 | 7 | 4 | 15 | 7 | 16 | | |
| 7 | 1 | 4 | 2 | 19 | 2 | 23 | | | 2 | 17 | | | | | | |
| 8 | | | 1 | 11 | | | 1 | 13 | | | | | | | | |
| 9 | | | 1 | 9 | | | | | 2 | 20 | | | 2 | 7 | | |
| 10 | | | 1 | 11 | | | | | | | | | | | | |
| 11 | | | 2 | 25 | | | 3 | 28 | | | 4 | 26 | 4 | 11 | 2 | 6 |
| 12 | | | 1 | 6 | 2 | 11 | 1 | 5 | | | | | 1 | 7 | | |
| 13 | 1 | 9 | 1 | 7 | 3 | 32 | 2 | 23 | | | | | 1 | 2 | | |
| 14 | | | 1 | 5 | | | 2 | 17 | 1 | 2 | | | | | | |
| **TOTALS** | 6 | 42 | 17 | 163 | 13 | 123 | 9 | 86 | 6 | 46 | 10 | 56 | 19 | 52 | 2 | 6 |

# Bridge Deck Overlays

Latex Modified Concrete (LMC)

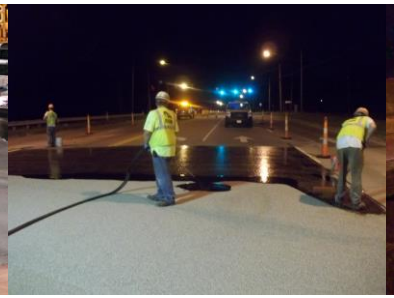
- M&T developing a certification class/program

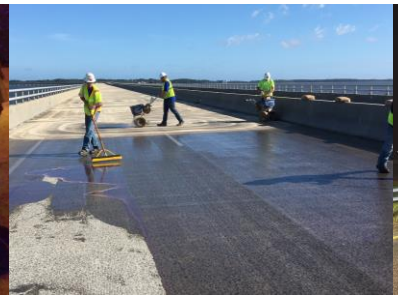
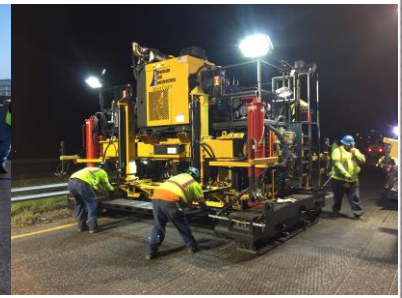
Epoxy Overlay

Silane

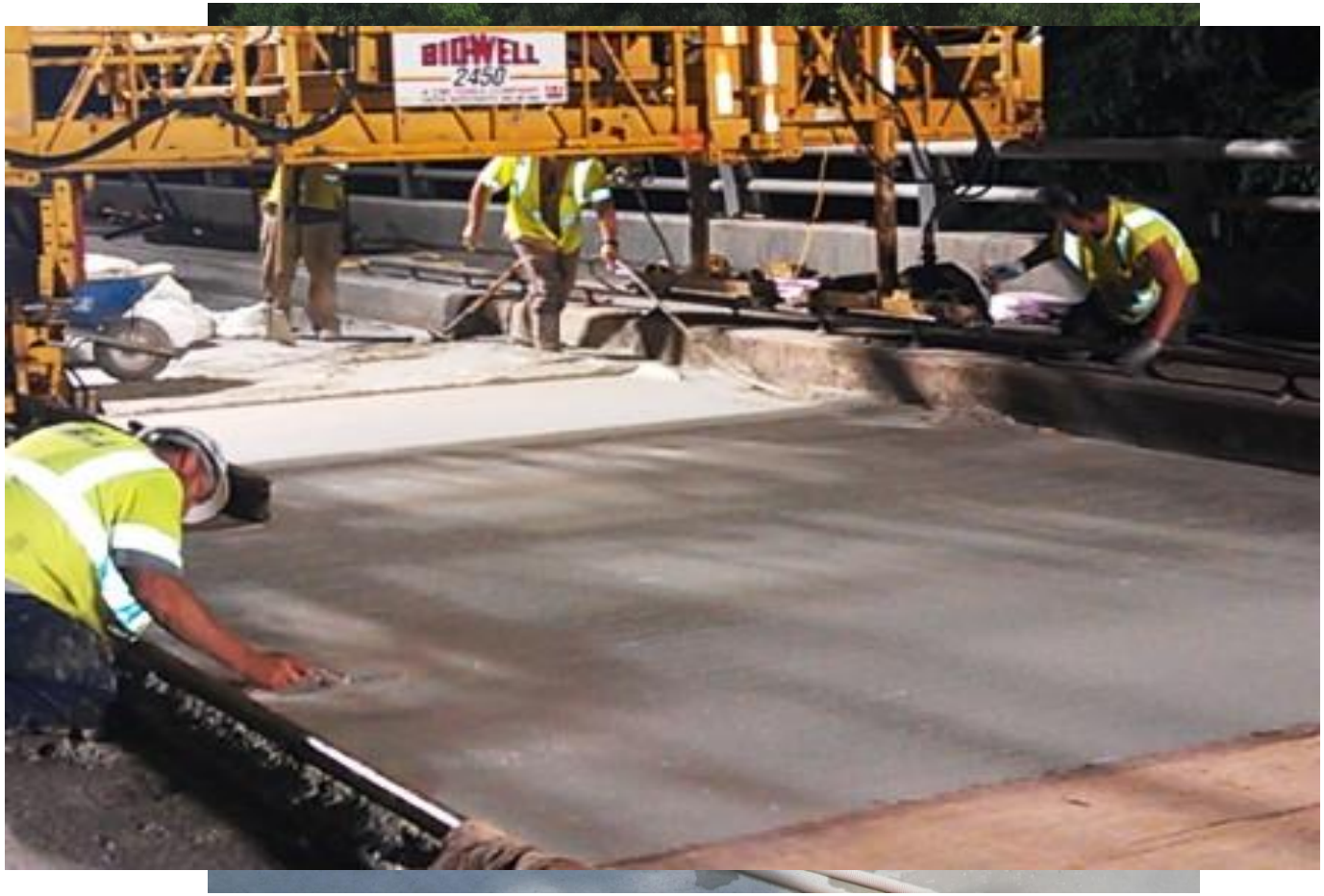
High Molecular Weight Methacrylate (HMWM)

Polyester Polymer Concrete (PPC)

# Latex Modified Concrete "LMC"



# Epoxy Overlays

2 lay
des
e

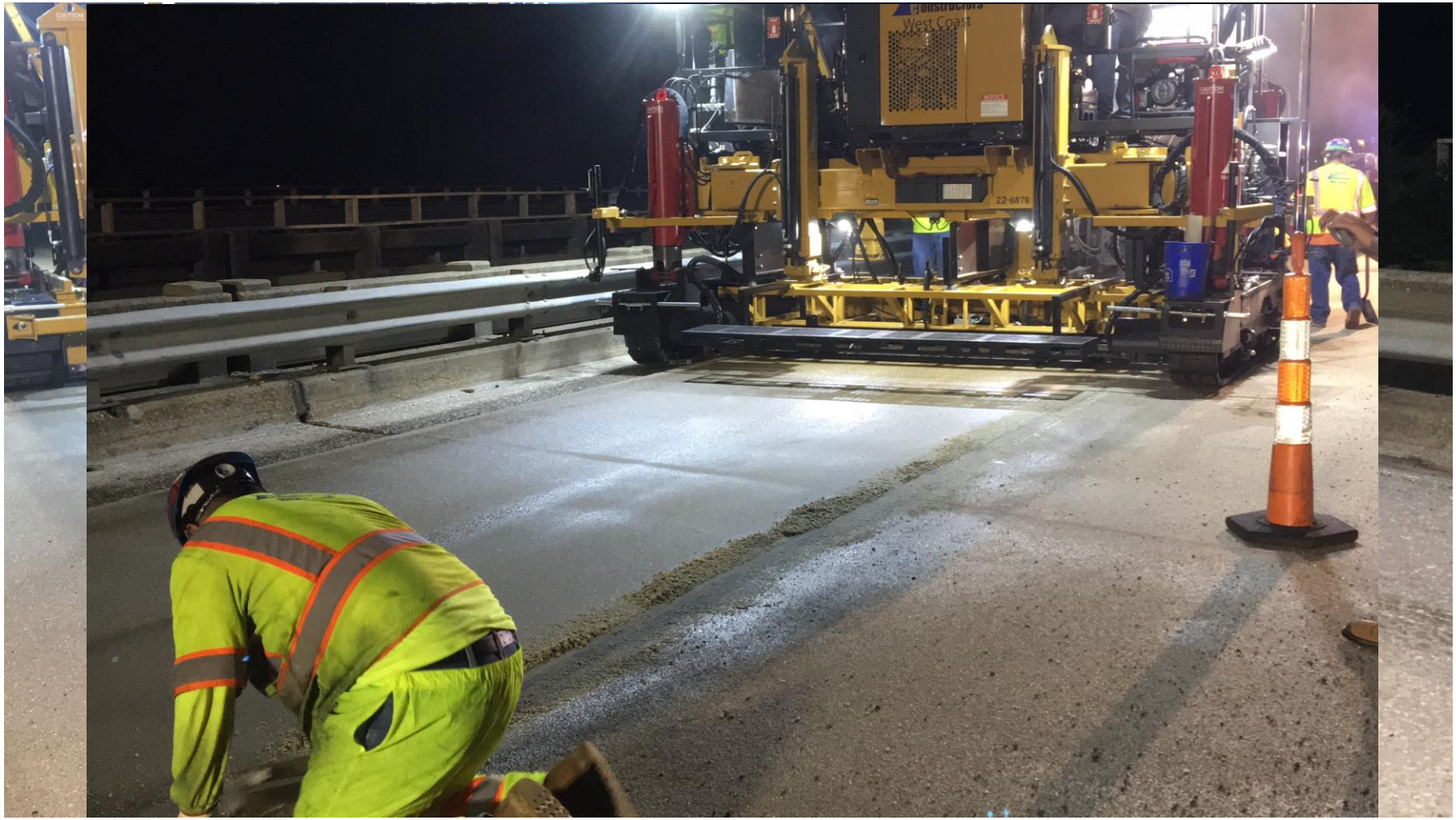
# Silane

Alkylalkoxysilane (silane) penetrant sealers, with 100% solids

# HMWM

## High Molecular Weight Methacrylate

# Polyester Polymer Concrete



# Bridge Deck Overlays

| Treatment | Preparation | Thickness | Cost | Service Life/ Reapplication Frequency |
|---|---|---|---|---|
| **Silane** | Shotblasting | N/A | $2-$3/SF | 7-10 years |
| **HMWM** | Shotblasting | N/A | $5-6/SF | 10 Years |
| **Epoxy Overlay** | Shotblasting | 3/8” | $10/SF | 10 years |
| **Polyester Polymer Concrete** | Shotblasting | 1” minimum | $24/SF | 25-30 years |
| **Latex Modified Concrete** | Hydrodemo | 1” minimum | $38/SF | 25-30 years |

# Bridge Deck Overlays

| Deck Grade | Description | Count | % of Bridges in NC | Potential Deck Treatment |
|---|---|---|---|---|
| 9 | Excellent | 59 | 0.4% | Nothing |
| 8 | Very Good | 1,160 | 8.6% | Silane |
| 7 | Good | 6,997 | 51.8% | Silane/ HMWM |
| 6 | Satisfactory | 2,772 | 20.5% | HMWM/ Epoxy/ PPC |
| 5 | Fair | 2,260 | 16.7% | PPC/ LMC |
| 4 | Poor | 259 | 1.9% | LMC/ Deck Replacement |
| 3 | Serious | 8 | 0.1% | Deck or Bridge Replacement |
| | | 13,515 | 100.0% | |

# Bridge Deck Overlays

| Overlay | Pre-Striping Preparation | |
|---|---|---|
| Silane | | |
| HMWM | | |
| Epoxy | | |
| PPC | | |

# Bridge Approach Fills

Type I – Standard Approach Fill

- Replaces the old Reinforced Approach
- Major routes – Interstate, Primary, Major collectors
- Used on 25’ Approach Slabs

Type II – Modified Approach Fill

- replaces the old Sub-Regional Tier
- Minor collectors, local, and secondary roads.
- Common for cored slabs and box beam bridges.

Type III - Reinforced Approach Fill

- To be used with MSE Wall Abutments

# Major Changes

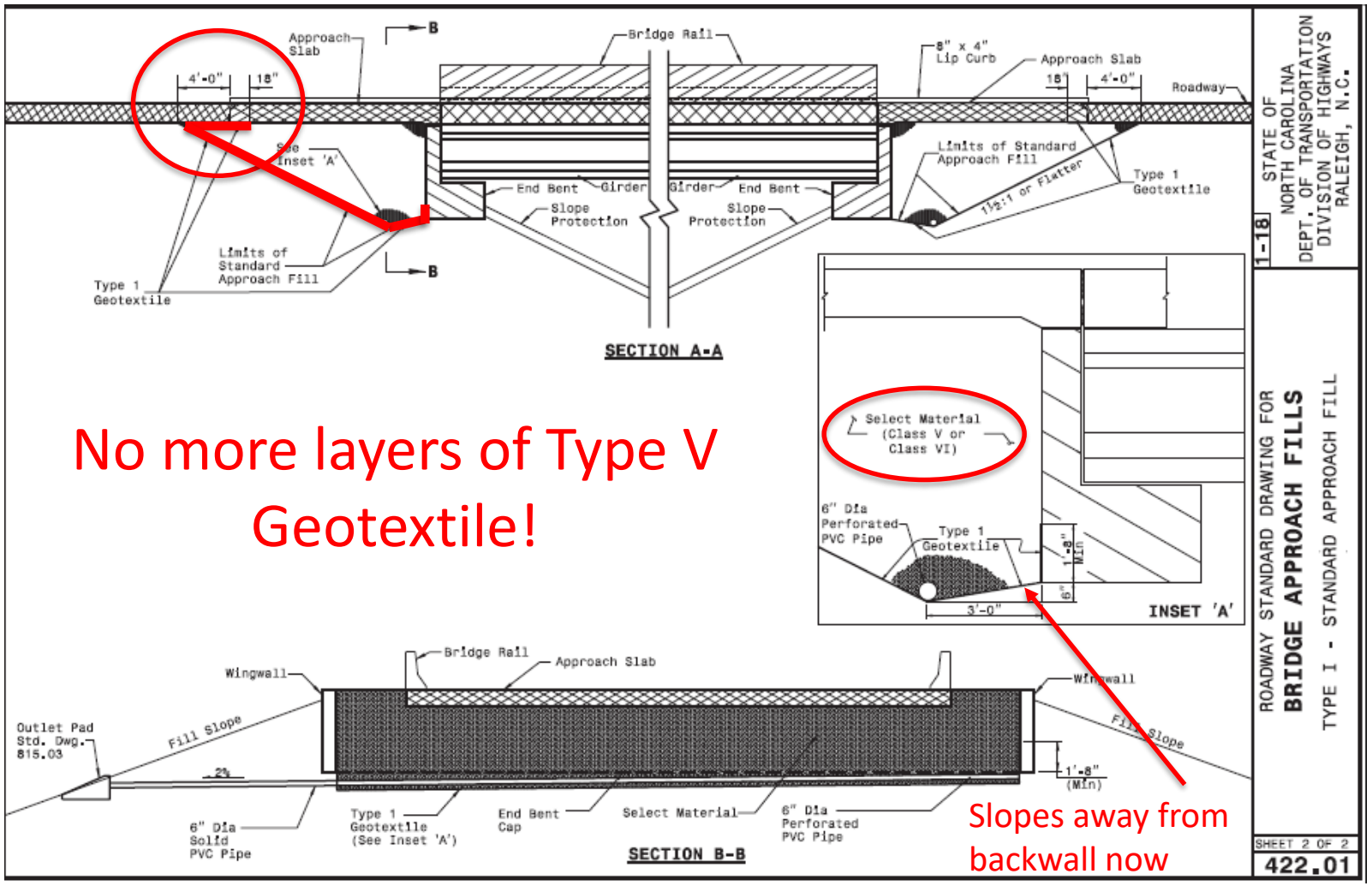
No more layers of Type V Geotextile

Drain location 3’ from backwall and slopes away

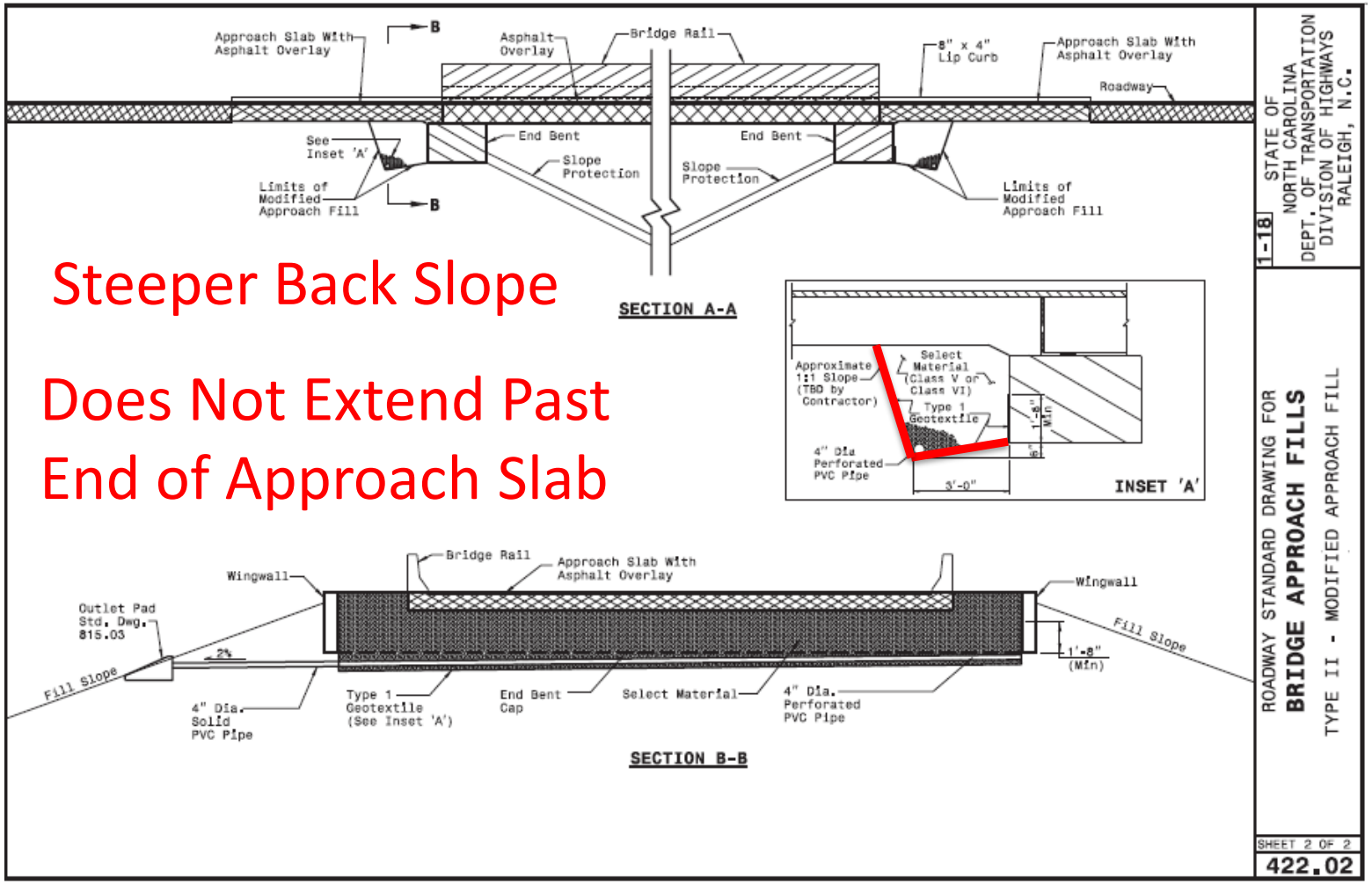
No more fine aggregate backfill allowed

- Exception – Type III when MSE wall utilizes fine aggregate

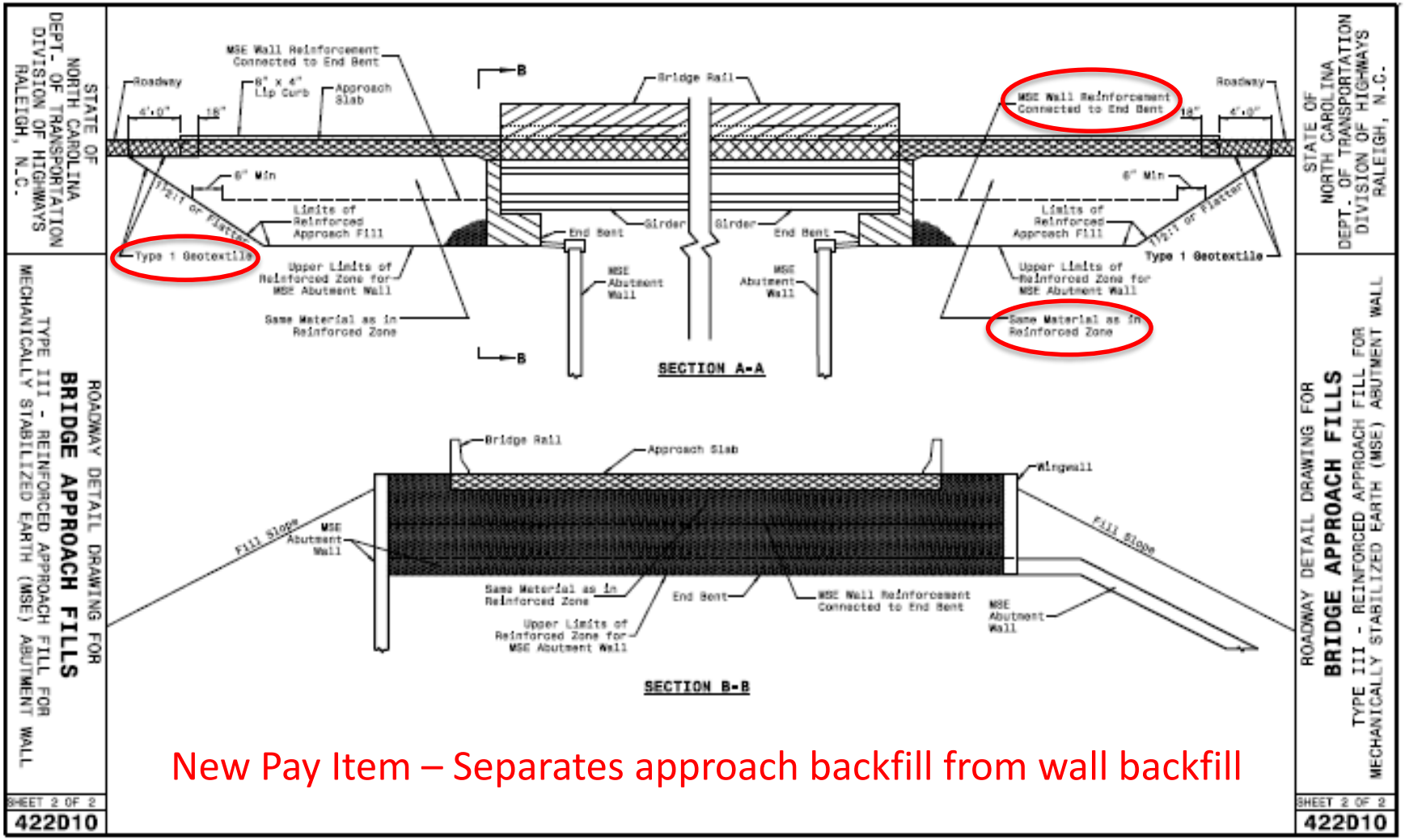
# Type I


Approach Slab
B
Bridge Rail
8" x 4" Lip Curb
Approach Slab
4'-0"
18"
18"
4'-0"
Roadway
See Inset 'A'
End Bent
Girder
Girder
End Bent
Slope Protection
Slope Protection
Limits of Standard Approach Fill
1½:1 or Flatter
Type 1 Geotextile
Limits of Standard Approach Fill
Type 1 Geotextile
B
SECTION A-A
Select Material (Class V or Class VI)
6" Dia Perforated PVC Pipe
Type 1 Geotextile
1'-8" Min
6"
3'-0"
INSET 'A'
No more layers of Type V Geotextile!
Wingwall
Bridge Rail
Approach Slab
Wingwall
Outlet Pad Std. Dwg. 815.03
Fill Slope
2%
Fill Slope
1'-8" (Min)
6" Dia Solid PVC Pipe
Type 1 Geotextile (See Inset 'A')
End Bent Cap
Select Material
6" Dia Perforated PVC Pipe
SECTION B-B
Slopes away from backwall now
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
1-18
ROADWAY STANDARD DRAWING FOR
BRIDGE APPROACH FILLS
TYPE I - STANDARD APPROACH FILL
SHEET 2 OF 2
422.01

# Type II

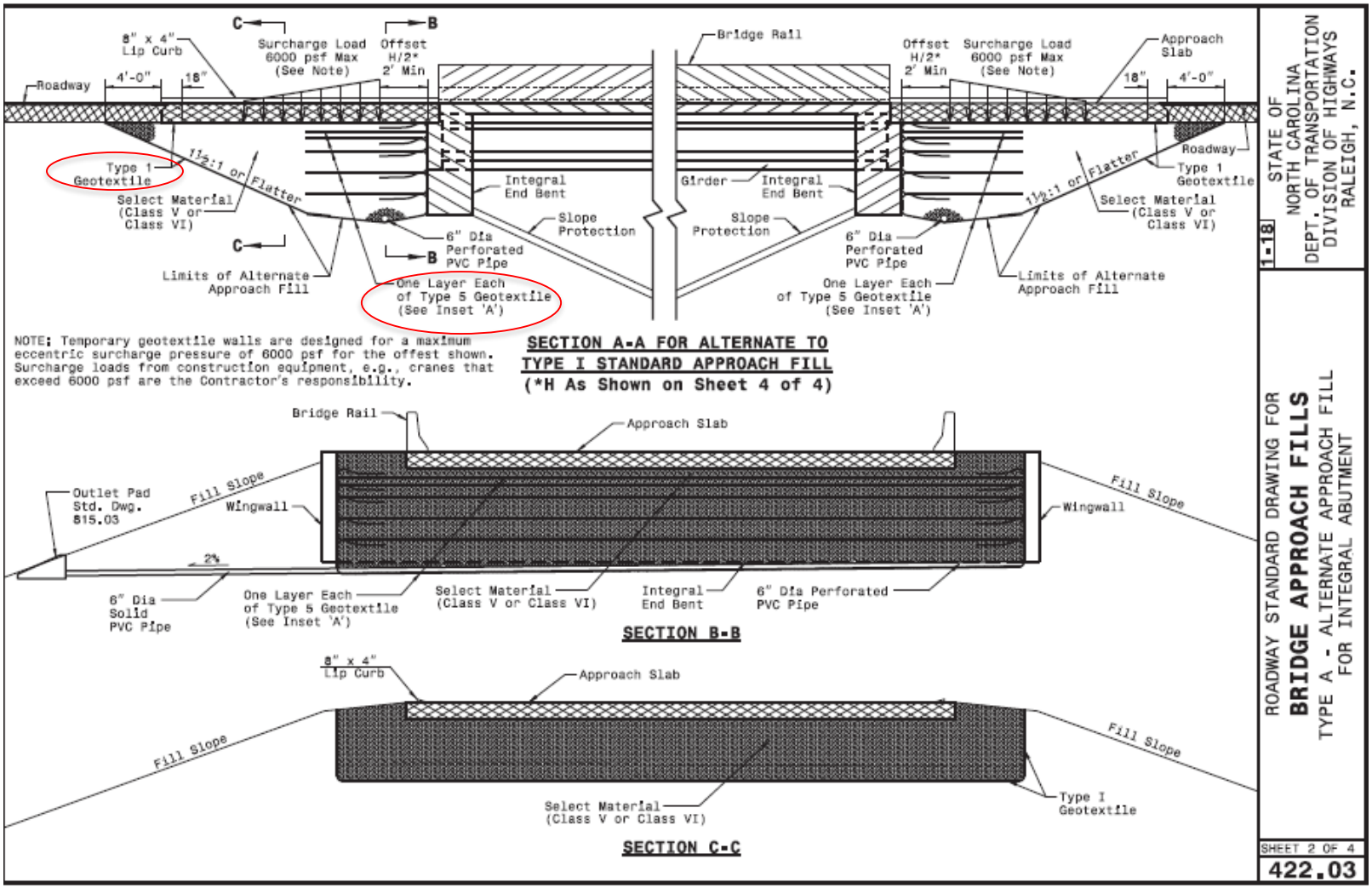

Approach Slab With Asphalt Overlay
B
Asphalt Overlay
Bridge Rail
8" x 4" Lip Curb
Approach Slab With Asphalt Overlay
Roadway
See Inset 'A'
End Bent
Slope Protection
End Bent
Slope Protection
Limits of Modified Approach Fill
B
Limits of Modified Approach Fill
SECTION A-A
Steeper Back Slope
Does Not Extend Past End of Approach Slab
Approximate 1:1 Slope (TBD by Contractor)
Select Material (Class V or Class VI)
Type 1 Geotextile
1'-0" Min
6"
4" Dia Perforated PVC Pipe
3'-0"
INSET 'A'
Wingwall
Bridge Rail
Approach Slab With Asphalt Overlay
Wingwall
Outlet Pad Std. Dwg. 815.03
2%
Fill Slope
Fill Slope
1'-8" (Min)
4" Dia. Solid PVC Pipe
Type 1 Geotextile (See Inset 'A')
End Bent Cap
Select Material
4" Dia. Perforated PVC Pipe
SECTION B-B
1-18
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
ROADWAY STANDARD DRAWING FOR
BRIDGE APPROACH FILLS
TYPE II - MODIFIED APPROACH FILL
SHEET 2 OF 2
422.02

# Type III

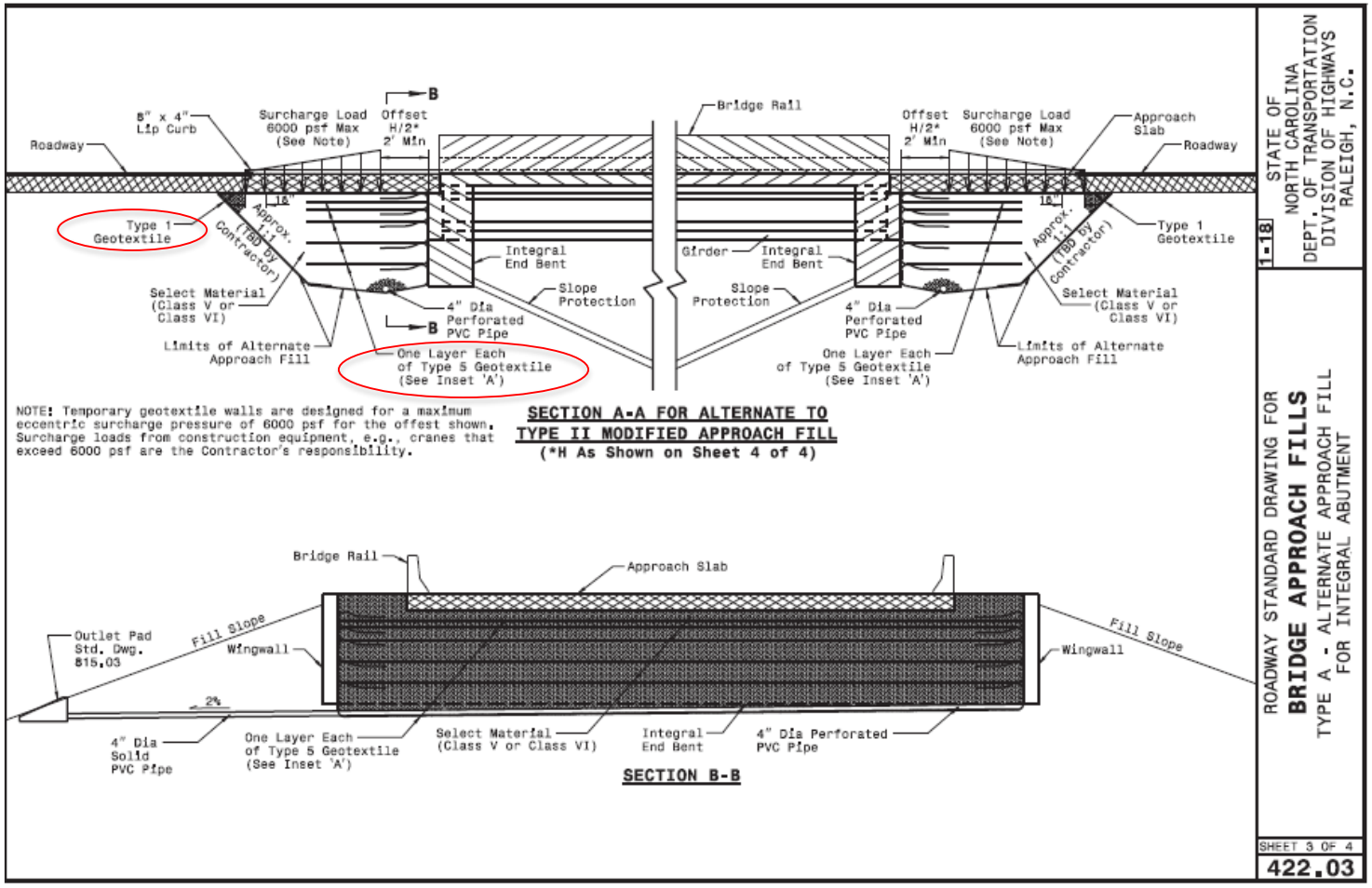



New Pay Item – Separates approach backfill from wall backfill

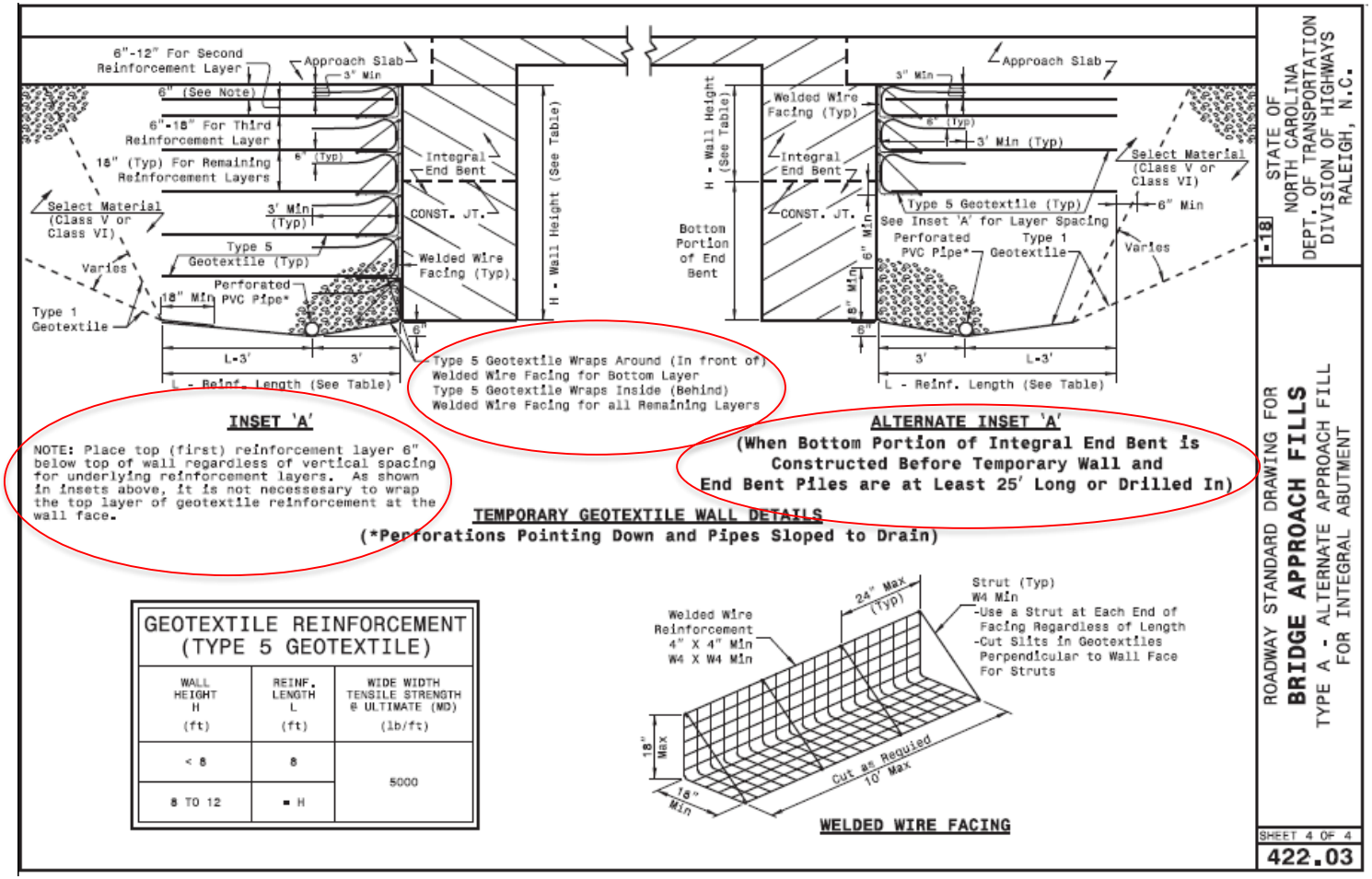
# Type A - I


8" x 4" Lip Curb
C
Surcharge Load 6000 psf Max (See Note)
Offset H/2* 2' Min
B
Bridge Rail
Offset H/2* 2' Min
Surcharge Load 6000 psf Max (See Note)
Approach Slab
Roadway
4'-0"
18"
Type 1 Geotextile
1½:1 or Flatter
Select Material (Class V or Class VI)
Integral End Bent
Slope Protection
6" Dia Perforated PVC Pipe
Limits of Alternate Approach Fill
One Layer Each of Type 5 Geotextile (See Inset 'A')
Girder
NOTE: Temporary geotextile walls are designed for a maximum eccentric surcharge pressure of 6000 psf for the offest shown. Surcharge loads from construction equipment, e.g., cranes that exceed 6000 psf are the Contractor's responsibility.
SECTION A-A FOR ALTERNATE TO TYPE I STANDARD APPROACH FILL
(*H As Shown on Sheet 4 of 4)
Outlet Pad Std. Dwg. 815.03
Fill Slope
Wingwall
2%
6" Dia Solid PVC Pipe
SECTION B-B
Type I Geotextile
SECTION C-C
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
1-18
ROADWAY STANDARD DRAWING FOR
BRIDGE APPROACH FILLS
TYPE A - ALTERNATE APPROACH FILL FOR INTEGRAL ABUTMENT
SHEET 2 OF 4
422.03

# Type A - II


8" x 4" Lip Curb
Surcharge Load 6000 psf Max (See Note)
Offset H/2* 2' Min
Roadway
Type 1 Geotextile
Approx. 1:1 (TBD by Contractor)
Select Material (Class V or Class VI)
Limits of Alternate Approach Fill
Integral End Bent
4" Dia Perforated PVC Pipe
Slope Protection
One Layer Each of Type 5 Geotextile (See Inset 'A')
Bridge Rail
Girder
Approach Slab
NOTE: Temporary geotextile walls are designed for a maximum eccentric surcharge pressure of 6000 psf for the offest shown. Surcharge loads from construction equipment, e.g., cranes that exceed 6000 psf are the Contractor's responsibility.
SECTION A-A FOR ALTERNATE TO TYPE II MODIFIED APPROACH FILL
(*H As Shown on Sheet 4 of 4)
Outlet Pad Std. Dwg. 815.03
Fill Slope
Wingwall
2%
4" Dia Solid PVC Pipe
SECTION B-B
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
1-18
ROADWAY STANDARD DRAWING FOR
BRIDGE APPROACH FILLS
TYPE A - ALTERNATE APPROACH FILL
FOR INTEGRAL ABUTMENT
SHEET 3 OF 4
422.03

# Type A - I or II


6"-12" For Second Reinforcement Layer
Approach Slab
3" Min
6" (See Note)
6"-18" For Third Reinforcement Layer
18" (Typ) For Remaining Reinforcement Layers
6" (Typ)
Integral End Bent
CONST. JT.
H - Wall Height (See Table)
Select Material (Class V or Class VI)
3' Min (Typ)
Type 5 Geotextile (Typ)
Welded Wire Facing (Typ)
Varies
Perforated 18" Min PVC Pipe*
Type 1 Geotextile
6"
L-3'
3'
L - Reinf. Length (See Table)
Type 5 Geotextile Wraps Around (In front of) Welded Wire Facing for Bottom Layer
Type 5 Geotextile Wraps Inside (Behind) Welded Wire Facing for all Remaining Layers
INSET 'A'
NOTE: Place top (first) reinforcement layer 6" below top of wall regardless of vertical spacing for underlying reinforcement layers. As shown in insets above, it is not necessesary to wrap the top layer of geotextile reinforcement at the wall face.
H - Wall Height (See Table)
Welded Wire Facing (Typ)
Integral End Bent
CONST. JT.
Bottom Portion of End Bent
6" Min
3" Min
Approach Slab
6" (Typ)
3' Min (Typ)
Select Material (Class V or Class VI)
Type 5 Geotextile (Typ)
See Inset 'A' for Layer Spacing
6" Min
Perforated PVC Pipe*
Type 1 Geotextile
Varies
3'
L-3'
L - Reinf. Length (See Table)
ALTERNATE INSET 'A'
(When Bottom Portion of Integral End Bent is Constructed Before Temporary Wall and End Bent Piles are at Least 25' Long or Drilled In)
TEMPORARY GEOTEXTILE WALL DETAILS
(*Perforations Pointing Down and Pipes Sloped to Drain)
GEOTEXTILE REINFORCEMENT (TYPE 5 GEOTEXTILE)
WALL HEIGHT H (ft)
REINF. LENGTH L (ft)
WIDE WIDTH TENSILE STRENGTH @ ULTIMATE (MD) (lb/ft)
< 8
8
5000
8 TO 12
= H
Welded Wire Reinforcement 4" X 4" Min W4 X W4 Min
24" Max (Typ)
Strut (Typ) W4 Min
-Use a Strut at Each End of Facing Regardless of Length
-Cut Slits in Geotextiles Perpendicular to Wall Face For Struts
18" Max
18" Min
Cut as Required 10' Max
WELDED WIRE FACING
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
1-18
ROADWAY STANDARD DRAWING FOR
BRIDGE APPROACH FILLS
TYPE A - ALTERNATE APPROACH FILL FOR INTEGRAL ABUTMENT
SHEET 4 OF 4
422.03

# Pile Driving – Pay Items

- Pile Driving Equipment Setup
  - New pay item
  - One per pile
  - No pay if not driven
- Piles
  - No change - “Per LF”

# Questions or Suggestions?